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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,305	09/26/2001	Henrik Botterweck	DE000155	1305

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EXAMINER

WOZNIAK, JAMES S

ART UNIT	PAPER NUMBER
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2655

DATE MAILED: 05/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/963,305

Applicant(s)

BOTTERWECK, HENRIK

Examiner

James S. Wozniak

Art Unit

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. In response to the office action from 8/18/2004, the applicant has submitted an amendment, filed 12/20/2004, amending Claims 1-11, while arguing to traverse the art rejection based on the limitation regarding a transformation utilizing several combined models (*Amendment, Page 7*). Applicant's arguments have been fully considered, however the previous rejection is maintained, altered with respect to the amended claims, due to the reasons listed below in the response to arguments.

2. Based on the amendments to claim 1, the examiner has withdrawn the previous objections directed towards minor informalities.

Response to Arguments

3. Applicant's arguments have been fully considered but they are not persuasive for the following reasons:

With respect to **Claim 1**, the applicant argues that Kuhn et al (U.S. Patent: 6,571,208) fails to teach a reduction criterion based on mutual variability used to realize a context-dependent phoneme (*Amendment, Page 7*). The examiner points out that a reduction criterion for a particular speaker utilizes Gaussian mixture models and an associated covariance, which results

Art Unit: 2655

in context-dependent phonemes essential for a specific speaker (*Col. 5, Line 56- Col. 7, Line 67*).

Thus, since Kuhn teaches the process for a reduction criterion for a supervector space (centroid subtraction to eliminate speaker idiosyncrasies leaving only allophone-relevant data) for a specific speaker as noted above, the rejection of Claim 1 is maintained.

The dependent claims are argued as further limiting a rejected independent claim (*Amendment, Page 8*), and thus also remain rejected.

Claim Objections

4. **Claims 10-11** are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim, or amend the claim to place the claim in proper dependent form, or rewrite the claim in independent form.

The infringement test for determining a proper dependent claim as per the MPEP 608.01 (n), Section III, states that a such a claim cannot conceivably be infringed by anything that would not also infringe the claim it references. In this case, a computer readable medium, such as a CD-ROM, containing a program would not infringe the method steps of Claim 1, since the program product *itself* never actually performs any of the active steps required by Claim 1. In other words *possession* of such a computer readable medium would infringe Claims 10-11, but not Claim 1.

Therefore, Claims 10-11 are improper dependent claims.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. **Claims 1-11** are rejected under 35 U.S.C. 102(e) as being anticipated by Kuhn et al (*U.S. Patent: 6,571,208*).

With respect to **Claim 1**, Kuhn discloses:

A method of determining an Eigenspace for representing a plurality of training speakers (Col.2, Lines 8-15), the method comprising the following steps:

Developing speaker-dependent (SD) sets of models for the individual training speakers while training speech data of the individual training speakers are used, the SD models of a set of models being described each time by a plurality of model parameters (*Fig.2, Element 20, and Col.4, Lines, 50-53*);

Displaying a combined model for each speaker in a high-dimensional vector space (e.g., supervector space) by concatenation of a plurality of the model parameters of the models of the sets of models of the individual training speakers to a respective coherent supervector (*Fig.2, Element 22; and Col.4, Lines 54-64*) ;

{The original dimensional space, i.e., the dimensional space of the supervector, is a high-dimensional space.}

Performing a transformation of the combined model (e.g., linear transformation) while reducing the dimension of the model space to derive Eigenspace basis vectors using reduction criteria based on mutual variability to realize a context-dependent phoneme which maintains all essential information after the transformation (Fig. 2, Element 24; Col. 4, Lines 65-67; Col. 5, Lines 1-5; and *Col. 5, Line 56- Col. 7, Line 67*).

With respect to **Claim 2**, Kuhn recites:

The models are Hidden Markov models (i.e., HMM) in which each state (e.g., state *s*) of a single model (e.g., Eigenmodel) is described by a respective mixture of a plurality of probability densities (e.g., *mixture Gaussian density: Col. 6, Lines 35-59*) and the probability densities are described each time by a plurality of acoustic attributes (e.g., phonemes) in an acoustic attribute space (e.g., speaker space) (*Col. 3, Lines 38-65; and Col. 4, Lines 44-46*).

With respect to **Claim 3**, Kuhn discloses:

The transformation for determining the Eigenspace basis vectors (e.g., eigenvectors) makes use of a reduction criterion based on the variability of the vectors to be transformed. (Col. 5, Lines 7-17).

With respect to **Claim 4**, Kuhn discloses:

Ordered attributes are determined for the Eigenspace basis vectors (*Col. 5, Lines 17-20*).

With respect to **Claim 5**, Kuhn discloses:

The Eigenspace basis vectors are the eigenvectors of a correlation matrix (e.g., mean supervector matrix) determined by means of the supervectors (e.g., mixture Gaussian means) and the ordering attributes of the Eigenvalues belonging to the Eigenvectors. (*Col. 6, Lines 44-67*).

With respect to **Claim 6**, Kuhn discloses:

For reducing the dimension of the Eigenspace a certain number of Eigenspace basis vectors are rejected while taking the ordering attributes into account (*Col.5, Lines 21-33*).

With respect to **Claim 7**, Kuhn discloses:

A method as claimed in claim 1, characterized in that for the high-dimensional model space (e.g., the original high-dimensional space), first a reduction (e.g., dimensionality, reduction) is made to a speaker subspace via a change of basis, in which speaker subspace all the supervectors of all the training speakers are represented and in this speaker subspace the transformation (e.g., linear transformation) is performed for determining the Eigenspace basis vectors (e.g., eigenvectors that define the Eigenspaces, i.e., the reduced dimensional space) (*Col.4, Lines 50-67; and Col.5, Lines 1-19*).

With respect to **Claim 8**, Kuhn discloses:

A method as claimed in claim 1, characterized in that the transformation is performed for determining the Eigenspace basis vectors on the different vectors of the supervectors of the individual training speakers to an average supervector (e.g., the centroids) (*Col.5, Lines 34- 42*).

{The centroids are determined by maximizing the auxiliary function Q and solving a set of linear equations (*Col. 6, Lines 8-67; and Col.2, Lines 1-50*).}

With respect to **Claim 9**, Kuhn discloses:

A speech recognition method in which a basic set of models (*e.g., context-dependent models*) is adapted to a current speaker on the basis of already observed speech data (e.g., speaker-adjusted training data) to be recognized of this speaker while an Eigenspace is used, which Eigenspace was determined based on training speech data of a plurality of training

Art Unit: 2655

speakers in accordance with a method as claimed in claim 8 (*Col.7, Lines 52-67; and Col.8, Lines 1-30*).

With respect to **Claim 10**, Kuhn discloses:

A computer program with program code means for executing all the steps of a method as claimed in claim 8 when the program is executed on a computer (e.g., recognition system) (*Col. 3, Lines 13-26*).

{The program with programming codes are inherent to the recognition system.}

With respect to **Claim 11**, Kuhn discloses:

A computer program with program code means as claimed in claim 10, which are stored on a computer-readable data carrier.

{Memory is inherent to the recognition system for storing training speech data and speech model parameters.}

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

Art Unit: 2655

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:


Goldenthal et al (*U.S. Patent: 5,625,749*)- teaches a means for reducing the dimensionality of a Gaussian probability density function utilizing a covariance matrix.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632 and email is James.Wozniak@uspto.gov. The examiner can normally be reached on Mondays-Fridays, 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached at (703) 305-4827. The fax/phone number for the Technology Center 2600 where this application is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the technology center receptionist whose telephone number is (703) 306-0377.

James S. Wozniak
4/15/2005



DAVID L. OMETZ
PRIMARY EXAMINER